WE CLAIM:

1. A compressor module for a turbine engine comprising:

an external housing having a forward end and an aft end;

an open mode inlet duct and a closed mode inlet duct in said external housing;

a forward bearing housing conically extending from said forward end of said external housing and into said external housing; and

a bell mouth circumferentially disposed within said external housing.

2. The compressor module of claim 1, further comprising a compressor wheel rotatably disposed at said aft end on a shaft.

3. The compressor module of claim 2, wherein said bell mouth and said compressor wheel define an air path for air to move through said compressor module and into a compressor discharge scroll.

4. The compressor module of claim 2, further comprising a speed sensor for measuring the speed of rotation of said shaft.

5. The compressor module of claim 2, further comprising:

a forward flange on said forward end; and

an aft flange on said aft end.

6. The compressor module of claim 1, further comprising a generator that converts rotational energy of said shaft into electrical energy.

7. The compressor module of claim 5, further comprising:

a hole in an apex portion of said conically extending forward bearing housing, wherein said shaft extends from said compressor wheel and through said hole;

a generator housing attached to said aft flange; and

a generator within said generator housing, said generator converting rotational energy of said shaft into electrical energy.

8. The compressor module of claim 7, further comprising a forward bearing disposed within said forward bearing housing, said forward bearing providing axial and radial support of a shaft extending through said hole of said forward bearing housing.

9. The compressor module of claim 1, wherein said compressor module is formed of titanium metal.

10. The compressor module of claim 1, wherein:

said open mode inlet duct communicates with atmospheric air;

said closed mode inlet duct communicates with engine bleed air of a main propulsion gas turbine engine; and

one of said open mode inlet duct and said closed mode inlet duct is open and the other is closed during operation of said gas turbine engine.

11. A compressor module for a gas engine, comprising:

an external housing having:

a forward end and an aft end,

an open mode inlet duct and a closed mode inlet duct in said external housing,

a forward bearing housing conically extending from said forward end of said external housing into said external housing,

a bell mouth circumferentially disposed within said external housing,

a forward flange on said forward end, and

an aft flange on said aft end;

a compressor wheel rotatably disposed at said aft end on a shaft; and

a compressor shroud/diffuser disposed circumferentially about said compressor wheel;

wherein said bell mouth and said compressor wheel provide an air path for air to flow to said rotatable compressor wheel and to be discharged into a compressor discharge scroll at an increased pressure from a pressure at said inlet duct.

12. The compressor according to claim 11, further comprising:

a hole in an apex portion of said conically extending forward bearing housing, wherein said shaft extends from said compressor wheel and through said hole;

a forward bearing disposed within said forward bearing housing, said forward bearing providing axial and radial support of a shaft extending through said hole of said forward bearing housing;

a generator housing attached to said single aft flange; and

a generator within said generator housing, said generator converting rotational energy of said shaft into electrical energy.

13. A compressor module for a gas turbine engine of an aircraft, comprising:

an external housing having:

a forward end and an aft end,

an open mode inlet duct and a closed mode inlet duct in said external housing,

a forward bearing housing conically extending from said forward end of said external housing and into said external housing,

a bell mouth circumferentially disposed within said external housing,

a forward flange on said forward end, and

an aft flange on said aft end;

a compressor wheel rotatably disposed at said aft end on a shaft;

a compressor shroud/diffuser disposed circumferentially about said compressor wheel, wherein said bell mouth and said compressor wheel provide an air path for air to flow to said rotatable compressor wheel and to be discharged into a compressor discharge scroll at an increased pressure from a pressure at said inlet duct;

a hole in an apex portion of said conically extending forward bearing housing, wherein said shaft extends from said compressor wheel through said hole;

a forward bearing disposed within said forward bearing housing, said forward bearing providing axial and radial support of said shaft extending through said hole of said forward bearing housing;

a speed sensor for measuring the speed of rotation of said shaft;

a speed sensor boss to isolate potential oil leakage from the flow path;

a generator housing attached to said single aft flange; and

a generator within said generator housing, said generator converting rotational energy of said shaft into electrical energy.

14. A gas turbine engine comprising:

a compressor module having:

an external housing with a forward end and an aft end,

an open mode inlet duct and a closed mode inlet duct in said external housing,

a forward bearing housing conically extending from said forward end of said external housing and into said external housing,

a bell mouth circumferentially disposed within said external housing,

a forward flange on said forward end, and

an aft flange on said aft end;

a combustion section attached at said aft end of said external housing;

a generator housing attached at said forward end of said external housing; and

a generator within said generator housing.

15. The gas turbine engine according to claim 14, further comprising:

a shaft extending from said combustion section, through said compressor module, and into said generator housing;

a compressor wheel rotatably disposed at said aft end on said shaft;

a compressor shroud/diffuser disposed circumferentially about said compressor wheel;

a hole in an apex portion of said conically extending forward bearing housing, wherein said shaft extends from said compressor wheel through said hole;

wherein said bell mouth and said compressor wheel provide an air path for air to flow to said rotatable compressor wheel and to be discharged into a compressor discharge scroll at an increased pressure from a pressure at said inlet duct.

16. The gas turbine engine according to claim 15, further comprising:

a forward bearing disposed within said forward bearing housing, said forward bearing providing axial and radial support of a shaft extending through said hole of said forward bearing housing; and

a speed sensor for measuring the speed of rotation of said shaft.

17. The gas turbine engine according to claim 15, wherein said gas turbine engine is used as an auxiliary power unit.

18. The gas turbine engine according to claim 17, wherein said auxiliary power unit is mounted in an aircraft having at least one propulsion engine.

19. The gas turbine engine according to claim 18, wherein when said aircraft is on the ground:

said shaft is rotated by said combustion section, said shaft rotates said compressor wheel and provides shaft rotational motion for said generator;

said open mode inlet duct communicates with atmospheric air; and

said closed mode inlet duct is closed.

20. The gas turbine engine according to claim 18, wherein when said aircraft is operated in flight:

said compressor wheel is rotated by pressurized bleed air delivered from said propulsion engine into said closed mode inlet duct, said compressor wheel rotates said shaft to provide shaft rotational motion for said generator.

21. A gas turbine engine used as an auxiliary power unit for an aircraft, comprising:

a compressor module having:

an external housing with a forward end and an aft end,

an open mode inlet duct and a closed mode inlet duct in said external housing,

a forward bearing housing conically extending from said forward end of said external housing and into said external housing,

a bell mouth circumferentially disposed within said external housing,

a forward flange on said forward end, and

an aft flange on said aft end;

a combustion section attached at said aft end of said external housing;

a generator housing attached at said forward end of said external housing;

a generator within said generator housing;

a shaft extending from said combustion section, through said compressor module, and into said generator housing;

a compressor wheel rotatably disposed at said aft end on said shaft;

a hole in an apex portion of said conically extending forward bearing housing, wherein said shaft extends from said compressor wheel through said hole;

a forward bearing disposed within said forward bearing housing, said forward bearing providing axial and radial support of said shaft; and

a speed sensor for measuring the speed of rotation of said shaft;

wherein said bell mouth and said compressor wheel provide an air path for air to flow to said rotatable compressor wheel and to be discharged into a compressor discharge scroll at an increased pressure from a pressure at said inlet duct.

22. The gas turbine engine according to claim 21, wherein:

when said aircraft is on the ground:

said shaft is rotated by said combustion section, said shaft rotates said compressor wheel and provides shaft rotational motion for said generator, said open mode inlet duct communicates with atmospheric air, and said closed mode inlet duct is closed; and

when said aircraft is operated in flight:

said compressor wheel is rotated by pressurized bleed air delivered from said propulsion engine into said closed mode inlet duct, said compressor wheel rotates said shaft to provide shaft rotational motion for said generator.

23. A method of providing auxiliary power with a gas turbine engine:

providing a compressor module having an external housing with a forward end and an aft end, an open mode inlet duct and a closed mode inlet duct in said external housing, a forward bearing housing conically extending from said forward end of said external housing into said external housing, and a bell mouth circumferentially disposed within said external housing;

attaching a generator housing at said forward end of said external housing;

providing a generator within said generator housing;

attaching a combustion section attached at said aft end of said external housing;

extending a shaft from said combustion section, through said compressor module and into said generator housing;

rotatably disposing a compressor wheel at said aft end on said shaft;

rotating said shaft to provide mechanical rotational power to said generator; and

converting said mechanical rotational power to electrical power.

24. The method according to claim 23, wherein said shaft is rotated by said combustion section, said shaft rotates said compressor wheel and provides shaft rotational motion for said generator, said open mode inlet duct communicates with atmospheric air, and said closed mode inlet duct is closed

25. The method according to claim 23, further comprising delivering pressurized air into said closed mode inlet duct to rotate said compressor wheel, said compressor wheel rotating said shaft to provide said mechanical rotational power.

26. The method according to claim 25, further comprising:

measuring rotational speed of said shaft; and

adjusting a volume of said pressurized air to adjust said rotational speed to a predetermined angular velocity.

27. The method according to claim 26, wherein said pressurized air is provided from bleed air of a gas turbine engine.